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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Nigel Paul Schofield

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EXAMINER

STIMPert, PHILIP EARL

ART UNIT

PAPER NUMBER

3746

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/536,781	Applicant(s) SCHOFIELD, NIGEL PAUL	
	Examiner Philip Stimpert	Art Unit 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 October 2008 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the plurality of drag pumping mechanism rotors attached to the turbomolecular pumping mechanism rotor as in claim 5 must be shown or the feature(s) canceled from the claim(s). See Response to Arguments section below for further discussion. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-5, 7-9 and 13-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Stones (US 6,135,709).

4. Regarding claim 1, Stones teaches a vacuum pumping arrangement comprising a turbomolecular pumping mechanism (50) having a rotor (9) with rotor blades (54), and a molecular drag pumping mechanism (2) connected in series (col. 3, ln. 12-16) with the turbomolecular pumping mechanism (50), and that a rotor (9) of the molecular drag pumping mechanism (2) is affixed to (via rotor 9 and rotor body 52, see col. 2, ln. 66-67) the rotor blades (54) of the turbomolecular pumping mechanism (50).

5. Regarding claim 2, Stones teaches an annular ring (at the interface between the blade supports, shaft, and rotor 9) provided to the rotor blades (54) to which the rotor (9) of the molecular drag pumping mechanism (2) is fixed.

6. Regarding claim 3, Stones teaches that the turbomolecular pumping mechanism (50) has a plurality of stages (as shown in Fig. 3), and that the rotor blades (54) as a whole are provided with the annular ring.

7. Regarding claim 4, Stones shows in Fig. 3 an inner cylinder (of the two Holweck type cylinders shown in Fig. 3) of the molecular drag pumping mechanism (2), which is

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supported in a position approximately half way along the radial length of the rotor blades (54) of the upper stage of the turbomolecular pumping mechanism (50).

8. Regarding claim 5, Stones teaches two Holweck type molecular drag pumping cylinders in Fig. 3, which, as they each provide an independent pumping action, may be considered a separate rotor, and thus together constitute a plurality of rotors. Further, this plurality of molecular drag rotors are considered to be affixed to the blades (54) of the turbomolecular pumping mechanism (50) in the manner detailed above with respect to claim 1.

9. Regarding claim 7, Stones teaches two physically parallel pumping paths on either side of each Holweck cylinder in Fig. 3 (the radially inward path pumping upward, the radially outward path pumping downward).

10. Regarding claim 8, Stones teaches that the molecular drag pumping mechanism (2) is a Holweck type pump (col. 2, ln. 7).

11. Regarding claim 9, in Fig. 3, Stones teaches two distinct rotors of the molecular drag pumping mechanism (2), each of which is supported by the rotor (9), which is also the rotor of a regenerative pumping mechanism (1). These distinct rotors may each be considered separate drag pumping mechanisms.

12. Regarding claim 13, the inner cylinder (of the two Holweck type cylinders shown in Fig. 3) of the molecular drag pumping mechanism (2) is supported in a position approximately half way along the radial length of the rotor blades (54) of the upper stage of the turbomolecular pumping mechanism (50).

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13. Regarding claim 14, Stones teaches two physically parallel pumping paths on either side of each Holweck cylinder in Fig. 3 (the radially inward path pumping upward, the radially outward path pumping downward).

14. Regarding claims 15-16, Stones teaches that the molecular drag pumping mechanism (2) is a Holweck type pump (col. 2, ln. 7).

15. Regarding claims 17-19, in Fig. 3, Stones teaches two distinct rotors of the molecular drag pumping mechanism (2), each of which is supported by the rotor (9), which is also the rotor of a regenerative pumping mechanism (1). These distinct rotors may each be considered separate drag pumping mechanisms.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stones in view of Rourk (US 4,465,434).

20. Stones substantially teaches the invention of claim 1 from which claim 10 depends, as discussed in the above rejection of claim 1 under 35 U.S.C. 102(b).

However, Stones does not teach the use of specific materials in his vacuum pump.

However, it is known that turbomolecular and molecular drag pumps generate heat.

Rourk teaches a carbon fiber composite turbine wheel, and that the use of carbon fiber composites increases the temperature at which a rotor may operate. Rourk further

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teaches that in his particular structure, "interlaminar shear stress associated with load transfer from radial to circumferential is minimized," (col. 2, ln. 3-5). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to form the rotor of the molecular drag pump of Stones from a carbon fiber composite as taught by Rourk in order to increase heat resistance and minimize interlaminar shear stress.

21. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stones in view of Schofield (US 5,230,924).

18. Regarding claims 11-12, Stones substantially teaches the invention of claims 1 and 2 from which claims 11 and 12 respectively depend, as discussed in the above rejection of those claims under 35 U.S.C. 102(b). Stones does not teach the use of specific materials in his vacuum pump. Schofield teaches that aluminum is generally useful for combined regenerative/Holweck pumps (col. 3, ln. 26-29). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use aluminum to form elements of the vacuum pump of Stones.

Response to Arguments

19. Applicant's arguments, see pages 7-8, filed 22 October 2008, with respect to indefiniteness have been fully considered and are persuasive. The rejection of claims 9 and 17-19 under 35 U.S.C. 112 has been withdrawn.

20. Applicant's remaining arguments have been fully considered but they are not persuasive.

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21. With respect to the drawings, the examiner maintains that the drawings do not substantially show multiple molecular drag pumping rotors. In particular, the amendments to the drawings appear to merely indicate reference signs 62a and 62b at diametrically opposite points of a single rotor. As amended, paragraph [0023] describes "the drag cylinder, or rotor, 62a, 62b (collectively 62)." This appears to describe a single cylinder or rotor, and the drawings (both Figs. 1 and 6) are easily interpreted in this light, with 62a and 62b representing diametrically opposite cross-sections of a single cylinder. The examiner does not see any indication in the drawings or specification of any feature of the rotor 62 which can reasonably be called a second rotor of a plurality. If the reference signs 62a and 62b are each intended to respectively indicate a roughly semicircular cylindrical section, then a different view would be required to illustrate that feature. If concentric or axially staged rotors are the intended embodiment, they are plainly not shown by the current drawings. The examiner reminds the applicant that no new matter should be entered to address this objection. The examiner notes that the claim language, particularly "affixed to," supports an interpretation of 46 as a second molecular drag pumping mechanism, but this does not appear to be the intended interpretation as indicated by the present amendments to the drawings and specification and their discussion in the applicant's remarks. Thus the examiner maintains the objection to the drawings.

22. With respect to the arguments regarding claim 1, the examiner believes that Stones substantially teaches a molecular drag pumping mechanism affixed to the rotor blades. That there are intervening elements in the linkage is not precluded by the

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present claim language. The examiner submits that “affixed to” may be reasonably interpreted in a broad fashion to read on the embodiment disclosed by Stones.

23. With respect to the arguments regarding claim 9, the examiner believes that the separate molecular drag pump rotors of Stones may be reasonably interpreted as substantially separate mechanisms. In particular, the molecular drag pumps of Stones act as serially arranged stages. Since each rotor performs the molecular drag pumping action on its own, the examiner interprets each as its own separate mechanism.

24. With respect to the arguments regarding obviousness, they do not present any further issues which must be addressed, relying instead on the alleged insufficiency of Stones with respect to claim 1.

25. In view of the foregoing, the examiner maintains the rejection of claims 1-5, 7-9 and 13-19 under 35 U.S.C. 102(b), and the subsequent rejections of claims 10-12 under 35 U.S.C. 103(a).

Conclusion

26. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip Stimpert whose telephone number is (571)270-1890. The examiner can normally be reached on Mon-Fri 7:30AM-4:00PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art
Unit 3746

/P. S./
Examiner, Art Unit 3746
8 January 2009